

Original Article

Effectiveness of a complex physical training program of fencers during the preliminary-basic work phase

ALLA KHOKHLA¹, OLHA PAVLOS²

¹Danylo Halytsky Lviv National Medical University,

²Lviv State University of Physical Culture, UKRAINE

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Abstract. The purpose is to determine the effectiveness of the program of physical training for athletes during preliminary-basic work that involves overall development of important physical qualities for fencing. Work on a comprehensive program of physical training for 12-14 year epee fencers contributed a significant increase to the level of all general and special physical performances.

Keywords: fencing, athletes, physical training.

Introduction

Challenge problem. At the present stage of sport's development the improvement of the system of long-term training of athletes in numerous groups of sport is carried out by correction of their physical training process [11, 13, etc.], because correlation became more closely between physical fitness and successful performance of athletes in competitions. The proper foundation of physical and functional training is a prerequisite not only for high achievements in sport, but also for saving them for a long time. Therefore, a significant amount of research is devoted to finding new effective approaches for improving the process of physical training of athletes in different qualification [2, 16, etc.].

The analysis of recent researches and publications. The retrospective analysis of scientific and methodical fencing literature revealed the presence of a significant amount of researches which aimed at studying individual aspects of physical fitness of fencers who specialize in different types of weapon [16 et al.]. However, the vast majority of them is focused on the study of methodological approaches about the development of certain physical qualities of epee fencers [9], or overlooked the specifics of competitive activity of fencers, who specialize in different types of weapons. Thus we found contradictions of scientific and methodological approaches to the development of physical qualities of fencers [18, 21, 23, etc.]. In particular, some scientists [3] present data about expediency of integrated development of physical qualities, others recommend accented to evolve profile physical qualities of fencing [1] others - [22] present data on the feasibility combination of specific fencing physical qualities of accentuated the development of best («major») qualities of each athlete. It appears also that there is differences in the programs for youth sports schools () [6, 7, and others.] in the structure of physical training of fencers at the stage of previous base buildup

As follows from the analysis of the scholarly and methodical literature we found certain scientific data about correlation of certain physical properties and performance of competitive activity and maintenance of physical training of 12-14-year fencers [8, 16, 20]. However, they don't consider the recent changes in the competition rules [24], which in turn cause changes in the structure and content of competitive activities [14, 17, 25]. This necessitates a comprehensive study of physical preparation of fencers taking into account the structure and content of competitive activities.

The purpose is to determine the effectiveness of the program of physical training of athletes during previous base preparation that involves integrated development of important physical qualities for fencing with swords

Research methods: analysis and synthesis; teacher observation using a mechanical device (dynamometer, timekeeping and pulsometry etc.). pedagogical experiment; methods of mathematical statistics.

Research organizing. Aiming to test the effectiveness of the proposed integrated program of physical training we realized ascertaining pedagogical experiment lasting three months. 17 athletes took part in the experiment (10 of them have II, and 7 have I athletic title). According to the program for Coach, DUISSHs (Children and Youth Sports Schools), SDUISHORs (Specialized Children and Youth Sports School of the Olympic Reserves), SHVSMs (Sports Schools of high sportsmanship) and ORM (Olympic Reserve Academy) have three trainings per week lasting 120 minutes for epee fencers. Therefrom, on the physical training was given about 40 minutes, that is the 1/3 of the length of each session. The methodological approach involved the comprehensive development of important for fencing with swords physical properties according to the structure of physical drill of skilled fencers [4].

Research results and discussion. During pedagogical experiment, athletes who trained under the program of integrated development of important for fencing with swords physical qualities, there have been positive changes in showings of both general and special physical fitness within the range from 0.6 to 12.6% (table 1 - 2).

Thus in showings of general physical preparedness (table 1) a significant increase was observed at the level of ability to orient in space - 12.1%, flexibility - 10.5%, explosive muscle strength of upper limbs - 8.1%, the reaction rate on a moving object - 8.9%, wrist strength - 8.8%, reaction rate of selection - 7.2%, fidelity 75%, long jump - 5.5%.

Table 1
Changes of intragroup data of overall physical fitness level of epee fencers (n = 17)

№	Tests	Before		After		t
		of experiment				
		M	SD	M	SD	
1.	Torso dynamometry, kgf	66,93	10,75	70,65	11,01	-1,179
2.	Wrist dynamometry, kgf	26,87	8,40	29,24	7,40	-0896
3.	Standing long jump, cm	172,93	19,87	177,35	22,82	-0,530
4.	Throwing of wadding ball, cm	388,13	114,15	422,88	107,5	-0,258
5.	Simple reaction rate, ms	181,93	42,84	180,7	38,13	0,374
6.	Reaction rate of a choice, ms	277,47	78,65	257,41	50,82	0,857
7.	Reaction rate on a moving object, ms	426,40	278,09	388,65	219,5	0,788
8.	30 m running on the move, c	4,75	0,78	4,61	0,80	0,700
9.	Harvard step test, c.u.	69,00	7,39	69,41	6,94	-0,299
10.	Side split, cm	28,00	9,05	25,06	7,73	0,390
11.	Fidelity of time intervals (3, 5, 8 c), c	2,27	0,88	2,21	0,75	0,447
12.	Fidelity 75% from the maximum strength of wrist, %	13,65	7,05	13,44	8,48	0,191
13.	Fidelity 75% from long jump, %	7,37	7,28	6,96	6,16	0,395
14.	Walking 10 m. straight line with closed eyes, cv	333,33	112,85	293,18	98,52	0,618

Note: $t_{crit} \geq 2,120$ for $p \leq 0,05$

On the one hand such increase of physical qualities level and forms of its manifestation can be explained by the specificity of event, which competition activity takes place in the setting of shortage of space and time. On the other hand, it confirms data of scientific and methodical literature, regarding the expediency of speed, flexibility and coordination qualities of athletes during pre-basic training [6, 17].

Despite the fact that the speed qualities are enough conservative quality and hardly amenable to development, a significant increase in the speed of complex motor response confirms literature data about the most fitness forms speed of athletes [5 and oth]. Established dissimilar increase of power qualities confirmed scientific data [17, 26, and oth.] that functional and structural young athletes' differentiation of individual muscle groups occur simultaneously.

In addition, as Turetskyi B. V. [18] noted, the increase of strength level and power-speed qualities occurs with increasing of muscle mass, development of coordination skills (ability to orient in space, fidelity of spatial and temporal parameters of movements and muscle efforts) and speed.

A somewhat smaller increase is detected in speed of running - 2.9%, fidelity intervals - 2.7%, explosive power of legs - 2.6%, fidelity 75% power of wrist - 1.5%.

The smallest positive changes were in showings of simple motor response rate - 0.8%, as the latent time of simple motor response is due mainly to genotype and defy development of sports training and Harvard step test - 0.6%, which may indicate a work's lack of development of general endurance.

Therewith, it should be noted that positive changes in showings of general physical preparedness of fencers EH-1, that comprehensively developed important physical qualities for fencing with swords had not statistically significant character and show only trends to improve physical fitness. As positive effect of lessons it is worth mentioning, that almost all indicators of overall physical fitness, with the exception of torso and explosive strength of legs, running speed and fidelity of 75% carpal force, standard deviation from the average physical showings of fencers with swords, who developed complex important for fencing physical qualities, significantly decreased, indicating a growth of homogeneity of the sample.

Among the data of special physical training of athletes (table 2) during the pedagogical experiment the largest increase was observed in the level of agility - 12.6%, which may indicate a considerable amount of time aimed at the development of this physical quality.

Table 2
Changes of intragroup data of special physical fitness level of epee fencers (n = 17)

№	Tests	Before	after		t	
		of experiment				
		M	SD	M		SD
1.	Long jump taking-off jumping leg, cm	150,97	23,38	160,35	19,88	-0,888
2.	Number of points in target whith lunging for 20 c	14,47	3,09	14,71	2,33	-0,205
3.	Moving forward 15 m in fighting stance, c	5,97	1,09	5,67	0,92	0,769
4.	Moving back 15 m in fighting stance, c	6,08	1,08	5,76	1,02	0,779
5.	Number of points in target for 60 c with a combination : step-jump-attack-return steps back	14,33	2,2	14,88	1,58	-0,879
6	Shuttle run 4x5 m, c	9,09	1,02	7,94	0,55	4,588

Note: $t_{crit.} \geq 2,120$ for $p \leq 0,05$

Just below, rather a significant increase that is determined in terms of explosive power of shaking leg 6.2%, movement speed in fighting stance back - 5.3%, and forward - 5.1%, on the one hand, which is probably due to the formation of stroke movement's technique [19], and on the other hand, with the ontogenetic peculiarities of speed-power and high-speed qualities in cyclic locomotions of 12 – 14 years old athletes [12].

The smallest improvements is identified in terms of the special endurance power - 3.8% and high-speed power - 1.7%, which is probably due to the fact that the stage of previous base preparation does not involve significant amounts of competitive pressures compared with skilled fencers and consequently specific reactions of adaptation is poor expressed [10].

In distinction from the overall performance, at the one of the six showings of special physical fitness statistically reliable changes was found ($r \leq 0,05$), namely the level of special dexterity. Therewith it should be noted that approximate changes to reliable differences in other showings were not found. Similarly to overall showings standard deviation decreased in all the terms of special physical training of athletes that positively characterizes the proposed program of physical training.

Total positive changes of general and special physical fitness of athletes who complex develop important for fencing with swords physical qualities during pedagogical experiment amounted to - 5.7%

Conclusions.

It is proved that classes on the integrated program of physical training of 12-14-year fencers contributed to a significant increase of the level of all general and special physical fitness.

The most significant positive changes is occurred in terms of flexibility, the ability to orient in space and agility.

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